

INTRODUCTION

A complete denture is an artificial replacement of the maxillary and / or mandibular dentition and associated structures. The functions of a complete denture are:

1- Mastication: Complete dentures chew food for swallowing and digestion.

2- Speech: The teeth, either natural or artificial, assist the tongue and lips to form some of the sounds of speech.

3- Appearance: The shape of the jaws together with the position and occlusal relationships of the teeth influence the facial appearance.

4- Health of the alveolar bone and T.M.J:

Alveolar bone resorption resulting from lack of function and T.M.J troubles from prolonged overclosure may be avoided by the wear of complete dentures.

The essential difference between natural and artificial teeth is that the former are firmly rooted in the bone of the jaws and in consequence they can incise, tear and finely grind food of any character because the lower teeth can move across the upper teeth with a powerful shearing action. Artificial dentures, on the other hand, merely rest on the gums and are held there by weak forces. In addition they are subjected to powerful displacing forces, so their efficiency as a masticator's apparatus is limited.

Esthetically, artificial teeth can be undistinguished from natural teeth, and in many cases they can enhance the appearance if the natural teeth were hypoplastic, grossly carious or unpleasantly irregular.

The **speech** of artificial denture wearers should be normal once tongue and lips have adapted themselves to the dentures.

CLINICAL AND LABORATORY STEPS FOR C.D. CONSTRUCTION

<u>CLINICAL</u>	<u>LABORATORY</u>
1 . Examination and Diagnosis.	3 . Pouring the Impression (Study Cast).
2 . Preliminary Impression.	4 . Special Tray Construction.
5 . Final Impression.	6 . Boxing the impression 7 . Pouring the Impression. 8 . Occlusion Blocks Construction.
9 . Jaw Relation Records. 13 .Try In Stage. 15 . Denture Insertion. 16 . Follow Up.	10 .Mounting U/L casts . 11 . Arrangement of Artifial Teeth . 12 .Waxing Up. 14 .Denture Processing.

Retention of Complete Denture

It is very important to discuss the retention of complete dentures in the introduction, so that the readers can appreciate the significance of the different procedures used for constructing the complete dentures.

There are four groups of factors in retention of complete dentures:

I- Factors Relating to the Fitting Surface:

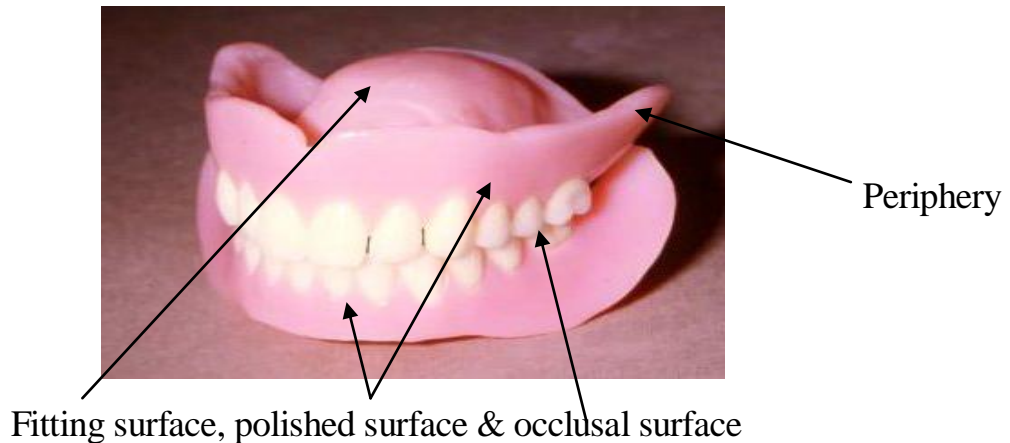
A. Adhesion and cohesion:

Adhesion is the physical attraction of unlike molecules for each other. It acts when saliva wets and sticks to the basal surface of the dentures and, at the same time, to the mucous membrane of the basal seat.

Cohesion is the physical attraction of like molecules to each other. It is a retentive force because it occurs in the layer of saliva between the denture base and the mucosa. It is effective in direct proportion to the area covered by the denture.

An example of adhesion is afforded by two microscope slides with a very thin film of water between them. The force required to separate the slides, provided it is at right angles, will be great, but if it is applied at a lesser angle the slides immediately commence to slip over one another and separate easily. The force of adhesion acts from the surface of the film of water to the surface of glass slide and from the other surface of the film to the other surface of the glass slide. Within the film of water the force of cohesion unites the molecules, and the thinner the film the more powerful is this force.

A denture base is made accurately to fit the mucous membrane on which it rests, and intervening between the two surfaces is saliva.



Adhesion & cohesion depends on the following factors:

a. Shape of the mouth:

A flat palate will provide a good surface adhesion while a V-shaped palate allows sliding and therefore retention is reduced.

b. Surface area:

The force of adhesion is proportional to the area of the surfaces in contact. A lower denture covers a very small surface area compared with an upper, and its adhesion is correspondingly less.

c. Closeness of denture adaptation:

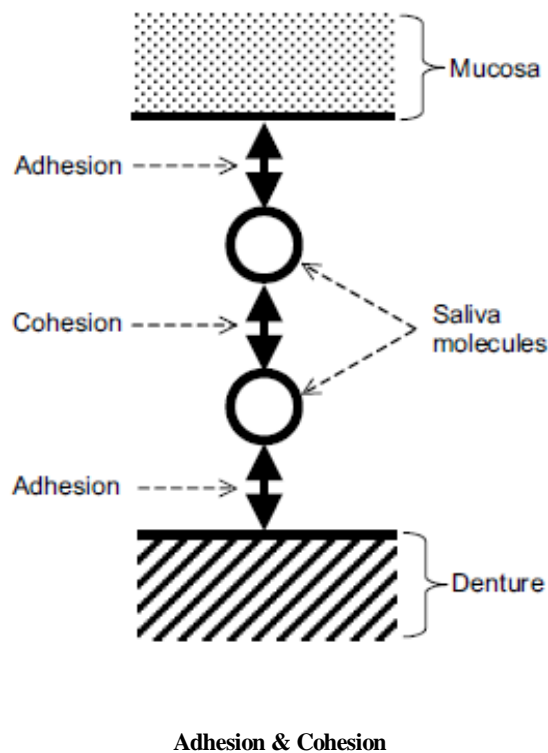
Adhesion depends on the closeness of apposition of the denture to the tissues. Fitness depends on the accuracy of the different procedures employed for denture construction.

d. Direction of the displacing forces:

Adhesion acts almost powerfully at right angles to the surface. Viscosity of the saliva is of importance in the phenomenon of cohesion. Saliva, which is more viscous than normal, reduces the cohesive force.

f. Saliva:

It is the medium that allows the physical factors of retention to act such as adhesion, cohesion, surface tension, and capillary attraction. Watery, diminished and abnormally viscous saliva can lead to poor denture retention.



B. Undercut area:

It is often very difficult to seat a denture directly upwards in the presence of an undercut in the tuberosities area. Therefore, the denture may be inserted into the undercut area first, and then the other side of the denture rotated into place on the opposite side. The undercut will retain the side inserted first.

II- Factors relating to denture periphery:

Atmospheric pressure:

The periphery of a denture should bed slightly into the soft tissues in the sulci, and except for the posterior border of the upper denture it will be covered by the lips and cheeks. When an upper denture is inserted air is expelled from between it and the mucous membrane, and provided the fit of the periphery to the tissues is good no air can get in because there is an efficient seal.

This means that the pressure acting on the fitting surface of the denture is less than that acting on the non-fitting surface (atmospheric pressure). The difference between these two pressures gives a positive force holding the denture in place.

III- Factors relating to occlusion:

Balanced articulation:

The efficiency and comfort that a patient experiences when using complete dentures depend to a large extent on the harmony of the occlusion. The interference and locking of cusps of the teeth as the lower teeth move across the upper teeth during chewing tend to displace both upper and lower dentures from their seating.

Balanced articulation means an arrangement of the teeth where in any occlusal relationship, as many teeth as possible are in occlusion, and when changing from one relationship to another they move with a smooth, sliding motion, free from cuspal interferences and maintaining even contact.

IV- Factors relating to the polished surface:

Acquired muscular control:

Dentures are always foreign bodies in the mouth and when placed for the first time most muscular actions tend to expel them. Gradually, however, the wearer learns to differentiate between the food and the dentures and learns to control and stabilize them with the tongue and cheeks. The tongue resting on the top of the lower denture and pressing it downwards and forwards can control its tendency to rise and also counterbalance to a large degree unbalancing masticatory forces. The tongue can also be unconsciously trained to prevent the back edge of the upper denture from dropping while the front teeth are incising. The muscular cheeks can be trained again unconsciously to press downwards on the buccal flanges of the lower denture whilst still carrying out their function of placing food between the teeth.

Full use of muscular control of dentures, requires that their design must follow certain lines:

- 1.** The teeth should be in a zone of neutral muscular force (neutral zone).
- 2.** The position of the lower teeth should allow the tongue to rest on top of the lower denture.
- 3.** The buccal and labial surfaces of the full dentures must be concave to allow for comfortable and free movement of the buccinators and orbicularis oris muscles. The lingual surface of the lower denture must be inclined inwards from above downwards, affording no undercut areas in which the tongue might lodge and unseat the denture.

Aids to Retention

Certain aids have been used to improve retention of complete dentures, some of these aids are more commonly used than others, and these include:

1. Overdentures:

The overdenture is a complete or partial denture prosthesis constructed over existing teeth or root structure.

2. Root-submergence:

Root submergence is an alternative to the conventional overdenture concept. This is achieved by sectioning the coronal portion of selected teeth and covering the remaining root structures with a mucoperiosteal flap. The pulp may be left vital, or endodontically treated with re-implantation.

3. Vestibuloplasty:

It is the surgical deepening of the sulcus in an attempt to increase the denture foundation area and, consequently, increasing retention and stability.

4. Ridge augmentation:

It is the surgical procedure used to increase the size of the ridge by implantation, grafting or surgery.

5. Implants:

An implant is a prosthetic device of alloplastic material implanted into the oral tissues beneath the mucosal and / or periosteal layer, and on/ or within the bone to provide retention and support for a fixed or removable prosthesis.

Other retention aids that are not commonly used include: Suction chambers (Air chambers), suction discs, weighted denture, denture fixatives (adhesives), springs and magnets.

Retention of complete dentures depends mostly on physical factors such as cohesion, adhesion and atmospheric pressure. It must be noted that this is true for upper dentures; lower dentures on the other hand are poorly retained by the physical forces because of their smaller surface area. They are retained entirely by mechanical means.

Stability of Complete Dentures

Stability is the quality of prosthesis to be firm, steady, or constant, to resist displacement by functional horizontal or rotational stresses.

Factors Affecting Stability of Complete Dentures:

1- Retention:

For a denture to be stable, it should be retentive. If the retentive forces acting on the dentures exceed the displacing forces and the dentures have adequate support. This support is determined by the form and consistency of the denture - bearing tissues and the accuracy of fit of the denture.

2- Balanced occlusion:

This means harmonious contact between upper and lower teeth in different positions of the mandible. If there is cusp interference, stability will be impaired.

3- Height of the Occlusal Plane:

The higher the occlusal plane in relation to the residual ridge, the greater will be the leverage action, and the lesser will be the stability of the denture. Therefore, the occlusal plane should be as near as possible to the ridge to enhance denture stability.

4- Position of the Posterior Teeth:

The posterior teeth should be set up over the crest of the ridge. If the teeth are set up too far outside the ridge, stability will be decreased.

5- Proper Relief of Hard Areas:

Insufficient relief of hard areas under the denture may cause rocking and instability of the denture. Median palatine raphe, torus palatinus and torus mandibularis are examples of hard areas that should be considered for relief.

6- Ridge and Palate Form:

Residual ridges with high vertical walls resist well lateral forces and accordingly enhance denture stability. On the contrary, flat ridges offer minimal resistance to lateral stresses and so decrease the chance of denture stability. Considering the palate form a high arched vault offers good resistance to lateral stresses, while a flat vault permits skidding of the denture.

7- Shape of the Polished Surface of the Denture:

The polished surface should be concave. The muscles of the tongue, cheeks and lips when acting on a concave polished surface will tend to seat rather than unseat the denture. The reverse happens when the polished surface is convex.

8- Shape and Size of the Tongue:

Broad and thick tongue enhances denture stability on the other hand small narrow tongue or extremely large tongue reduces denture stability.